

**Notice of Allowability**

Application No.

10/602,833

Examiner

Thomas R Artman

Applicant(s)

BURNS ET AL.

Art Unit

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**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 25 June 2003.
2. ☒ The allowed claim(s) is/are 26-30.
3. ☒ The drawings filed on 25 June 2003 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
  1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date 06/25/2003
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7. ☐ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

**DETAILED ACTION**

***Allowable Subject Matter***

Claims 26-30 are allowed.

The following is an examiner's statement of reasons for allowance:

The prior art made of record, alone or in combination, does not disclose or reasonably teach forming a connector for interconnecting a buffer layer to another surface of the substrate, where the buffer layer is made of silicon, oxygen and nitrogen, and is further doped with a Group IVB element, in conjunction with a single-crystal, electro-optic waveguide with at least one electrode, as required by the combination as claimed in claim 26.

Claims 27-30 are allowed by virtue of their dependency.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### *Conclusion*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

DuPuy (US 5,153,930) discloses a lithium niobate-based planar optical waveguide with an undoped silicon dioxide buffer layer (Fig. 1C, item 10) for confining the light in the waveguide and for hindering ion diffusion. DuPuy also teaches the connection of two titanium metal films (items 20 and 30) electrically connected by a conductive paste (item 32) for helping to neutralize the charge buildup due to ion diffusion. DuPuy neither teaches the connection for silicon dioxide, an amorphous dielectric (electrical insulator), with its companion layer (item 12), nor teaches the presence of nitrogen in the buffer layer or doping the buffer layer.

Nishimoto (US 5,617,493) teaches that the silicon dioxide buffer layer can be substituted with various materials, including silicon oxynitride. Nishimoto also teaches that a buffer layer of silicon dioxide can be doped with elements such as titanium. However, there isn't any teaching for providing electrical connection between the buffer layer and the underside of the substrate or doping the silicon oxynitride material.

Edlinger (US 5,675,691) teaches the use of high index oxynitrides of silicon, hafnium or aluminum for use as optical confinement layers in phase masks.

Seino (US 5,404,412) teaches the use of indium oxides with oxides of silicon in buffer layers.

Callegari (US 6,395,650) discloses titanium silicon oxynitrides as examples of metal oxide dielectric materials that can be purified by his manufacturing process; there isn't any teaching for the use of such materials in actual devices.

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Kitamura (US 5,479,552) teaches a multi-layer buffer layer structure; however, no teachings of the use of doped silicon oxynitride or layer interconnection exists.

Richard (US 4,701,008) teaches the significance of silicon oxynitrides in the art; however, there isn't any teaching to dope the material with Group IVB elements.

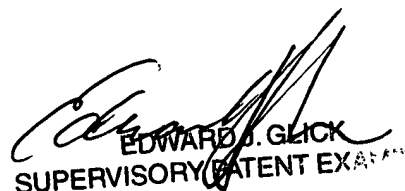
Melloni (US 6,583,917) provides a "laundry list" of possible materials of electro-optic devices.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas R Artman whose telephone number is (571) 272-2485. The examiner can normally be reached on 9am - 6:30pm Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thomas R. Artman  
Patent Examiner



EDWARD J. GLICK  
SUPERVISORY PATENT EXAMINER